

**IN THE UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF MICHIGAN
SOUTHERN DIVISION**

BEACON NAVIGATION GMBH,

Plaintiff,

v.

BAYERISCHE MOTOREN WERKE AG,
BMW OF NORTH AMERICA, LLC, AND
BMW MANUFACTURING CO., LLC,

Defendants.

Case No. 2:13-cv-11410-MAG-EAS

Hon. Mark A. Goldsmith
Mag. Elizabeth A. Stafford

**OPINION AND ORDER GRANTING IN PART AND DENYING IN PART
BEACON’S MOTION FOR SUMMARY JUDGMENT OF NO INVALIDITY
(ECF No. 102)**

In this patent infringement case, plaintiff Beacon Navigation GmbH (“Beacon”) alleges that defendants Bayerische Motoren Werke AG, BMW of North America, LLC, and BMW Manufacturing Co., LLC (collectively, “BMW”) infringe a Beacon patent on vehicle navigation technology, U.S. Patent No. 5,862,511 (the “511 Patent”).

Presently before the Court is Beacon’s motion for summary judgment of no invalidity as to BMW’s prior art invalidity defenses. The parties have submitted written briefs explaining their positions on the validity issues in this case. ECF No. 102 (“Beacon’s Motion”); ECF Nos. 113, 116 *SEALED* (“BMW’s Opposition”);

ECF No. 123 (“Beacon’s Reply”). Pursuant to Local Rule 7.1(f)(2), the Court will decide Beacon’s motion for summary judgment of no invalidity without a hearing. E.D. Mich. LR 7.1(f)(2).

For the reasons stated in this opinion and order, the Court will **GRANT IN PART** and **DENY IN PART** Beacon’s motion for summary judgment of no invalidity.

I. PROCEDURAL HISTORY

This case once belonged to a larger group of related patent infringement cases involving additional defendants and additional Beacon patents. The Court has previously set forth a detailed procedural history of these cases. ECF No. 88, PageID.4120-4122. Only this case against BMW, which now only involves the ’511 Patent, remains pending. In summary, this case was filed by Beacon on October 11, 2011 in the United States District Court for the District of Delaware and transferred to this District on March 20, 2013. Beginning on August 12, 2013, the Court stayed this case pending a succession of proceedings in the United States Patent and Trademark Office (the “USPTO”). While ultimately cancelling the asserted claims of other Beacon patents, the USPTO issued four reexamination certificates confirming the novelty and non-obviousness of the asserted claims of the ’511 Patent. *Ex Parte* Reexamination Certificate Nos. 5,862,511 C1, 5,862,511 C2, 5,862,511 C3, and 5,862,511 C4.

On August 19, 2022, following the conclusion of the last USPTO proceeding, the Court lifted the stay. On November 18, 2022, Beacon filed a first amended complaint (“FAC”), alleging that BMW infringes the ’511 Patent. ECF No. 60. On December 2, 2022, BMW answered and counterclaimed for declaratory judgment, denying that it infringes the ’511 Patent and alleging that the ’511 Patent is invalid. ECF No. 62. On December 16, 2022, Beacon answered, denying that the ’511 Patent is invalid. ECF No. 63.

In the FAC, Beacon alleges that BMW infringed Claims 1 and 3 of the ’511 Patent in connection with sales of vehicles with GPS navigation systems (the “accused vehicles” and the “accused navigation systems”) prior to the ’511 Patent’s December 28, 2015 expiration date. Beacon alleges that BMW directly infringed Claim 1 by making, importing, and selling the accused vehicles. ECF No. 60, PageID.3223-3224 (FAC ¶¶ 16-17). Beacon alleges that, with knowledge of the ’511 Patent, BMW induced consumers to infringe Claim 3 by providing the accused vehicles along with instructions to use the accused navigation systems. ECF No. 60, PageID.3226 (FAC ¶¶ 22-24).

On July 28, 2023, the Court denied BMW’s motion to dismiss Beacon’s induced infringement claims. ECF No. 88. Additionally, the Court issued an opinion and order construing the disputed claim terms within the asserted claims of the ’511 Patent, pursuant to *Markman v. Westview Instruments, Inc.*, 517 U.S. 370 (1996).

ECF No. 87. On December 28, 2023, the Court denied BMW's motion for judgment on the pleadings that the asserted claims of the '511 Patent are invalid as patent ineligible. ECF No. 111.

On December 11, 2023, Beacon filed its present motion for summary judgment of no invalidity, asking the Court to grant summary judgment of no invalidity as to BMW's prior art invalidity defenses.

II. '511 PATENT

The '511 Patent, entitled "Vehicle Navigation System and Method," was filed in the USPTO on December 28, 1995 and issued on January 19, 1999. The '511 Patent expired on December 28, 2015, twenty years after its filing date. *See* 35 U.S.C. § 154(a)(2).

The '511 Patent is directed to vehicle navigation technology. In the written description, the '511 Patent begins with a helpful background section on prior navigation systems. In general, to support a vehicle's navigation functionality, such as route guidance and turn-by-turn navigation, navigation systems work by continuously determining the vehicle's current position. To determine the current position, navigation systems use information from a Global Positioning System (GPS), motion sensors, and a map database. '511 Patent 1:16-2:25. In connection with these components, as the vehicle moves and the once-current position becomes a previous position, navigation systems can use different techniques to re-determine

the current position. For example, a GPS position based on information from space-based satellites can be used for the current position. *Id.* 1:16-18. Alternatively, using “propagation” (also known as “dead reckoning”) techniques, information from the motion sensors can be used to propagate the current position from the previous position. *Id.* 1:63-2:3. Moreover, using “map matching” techniques, information from the motion sensors can be matched to a position in the map database, and the resulting map-matched position can be used for the current position. *Id.* 2:13-25.

The '511 Patent describes a navigation system that uses GPS velocity information to implement purportedly improved propagation techniques. *Id.* 2:32-3:13. Before turning to the disclosed propagation techniques, it is important to note that the '511 Patent assumes knowledge of math principles, two of which are relevant to the asserted claims. First, position and velocity are “vectors.” This means that, in addition to their distance and speed (i.e., magnitude) components, position and velocity have a heading (i.e., direction) component. Accordingly, map-matched positions have map headings, and GPS velocities have GPS headings, that point, for example, in the East and North directions. *Id.* 2:32-36, 7:67-8:3. Second, relevant to the disclosed propagation techniques, velocity can be “integrated” to obtain “displacements” (i.e., changes in position) in the directions of the heading. Accordingly, GPS velocities can be integrated to obtain displacements, which can

then be applied to the previous position to obtain the current position. *Id.* 15:45-49, 15:58-63, 16:12-16.

In connection with the disclosed propagation techniques, Claims 1 and 3 of the '511 Patent are directed to an embodiment for updating GPS velocity information with a map heading. *Id.* 15:29-44, 15:53-16:22. As shown in Figure 7c, reproduced below, the embodiment involves steps for updating a GPS velocity vector (**200**) with a map heading (**202**) for use in the propagation of a previous position (**191**) to a current position (**206**). *Id.* 15:53-65.

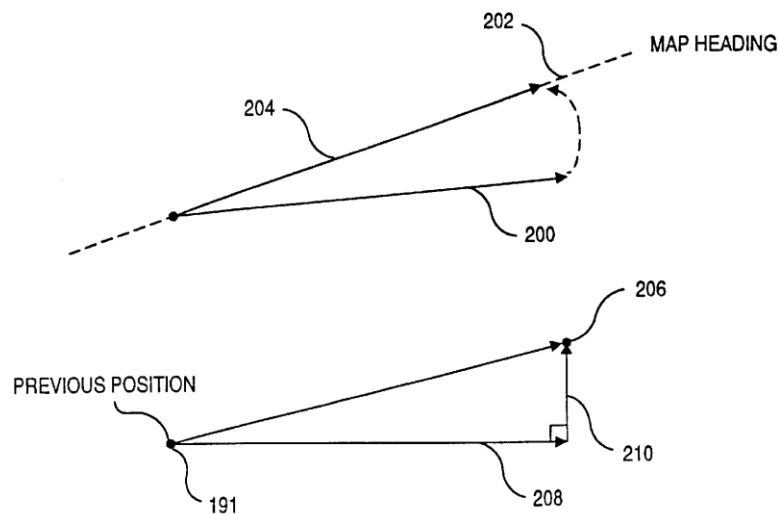


Fig-7c

The GPS velocity vector (**200**) has GPS speed and GPS heading components. *Id.* 2:32-36. The map heading (**202**) is based on the heading of the mapped path on which the vehicle is traveling. *Id.* 15:29-34. When the difference between the GPS heading and the map heading (**202**) is within a threshold, the GPS velocity vector

(**200**) is rotated to align with the map heading (**202**). *Id.* 15:58-63. The rotated GPS velocity vector (**204**) is then integrated to obtain displacements (**208** and **210**). *Id.* The displacements (**208** and **210**) are then applied to the previous position (**191**) to obtain the current position (**206**). *Id.* 15:63-65.

Claim 1 recites the patented navigation system, and Claim 3 recites the patented navigation method:

1. An improved vehicle navigation system comprising:

a map database with map information, said vehicle navigation system derives a map heading from said map information; and

a GPS receiver which provides GPS velocity information including a heading, said vehicle navigation system uses said velocity information to propagate a previous position to a current position and interrogates said map database to obtain said map heading information; said vehicle navigation system updates said velocity information with said map heading for propagating said previous position to said current position if the difference between the heading of said velocity information and said map heading are within a threshold, wherein said system rotates said velocity to align with said map heading and integrates the rotated velocity to obtain displacements; said system obtains said current position by applying said displacements to said previous position.

3. A method of estimating the velocity of a vehicle known to be on a mapped path comprising:

determining the velocity of the vehicle, the velocity including a heading;

interrogating a map database to obtain a map heading of said mapped path; and

updating said velocity with said map heading if the difference between the heading of said velocity and said map heading are within a threshold;

using said velocity to propagate a previous position to a current position, wherein said step of using includes rotating velocity to align with said map heading and integrating rotated velocity to obtain a displacement and obtaining said current position by applying said displacement to said previous position.

Id. 17:11-29 (Claim 1), 17:48-63 (Claim 3).

As noted above, Claims 1 and 3 are directed to the embodiment shown in Figure 7c. Claim 1 recites a GPS receiver and a map database, and is otherwise directed to a navigation system that generally performs the steps recited in Claim 3.

At the claim construction stage of this case, before turning to the disputed claim terms, the Court adopted several agreed constructions. By agreement of the parties, “velocity” means “velocity vector, which includes speed and heading components.” Similarly, “GPS velocity information” means “information based on the speed and heading of the GPS receiver.” With respect to the rotate–then–integrate sequence, “rotates said velocity to align with said map heading” means “rotates the velocity vector to align with the map heading while maintaining the magnitude of the velocity vector,” and “integrates the rotated velocity to obtain displacements” means “calculates the integral of the rotated velocity to obtain displacements.” ECF No. 87, PageID.4090-4091.

As to the proper constructions of the disputed claim terms, the Court resolved the disputed issues of definiteness in Beacon's favor and adopted Beacon's proposed constructions. Among other things, the Court found that "current position" is not indefinite, and that "previous position" and "current position" should be given their plain and ordinary meanings. Similarly, the Court found that "propagating said previous position to said current position" is not indefinite, and should be given its plain and ordinary meaning. ECF No. 87, PageID.4092-4101 (current position term), PageID.4101-4103 (propagation terms), PageID.4114-4116 (previous position term).

III. BMW'S PRIOR ART INVALIDITY DEFENSES

Beacon's motion for summary judgment of no invalidity centers on an opening expert report from BMW's technical expert on validity, Dr. Samuel Pullen, Ph.D. ("invalidity report"). ECF No. 102-3 (Pullen Report); ECF No. 102-17 (Pullen Dep. Tr.).

As disclosed through Pullen's invalidity report, BMW bases its affirmative defenses of anticipation and obviousness on three prior references directed to GPS-based navigation systems: (1) U.S. Patent No. 5,902,351 to Streit et al. ("Streit"); (2) U.S. Patent No. 5,541,845 to Klein ("Klein"); and (3) Japanese Patent Application Publication No. H4[1992]-121618 to Yoshinori et al. ("Yoshinori"). With respect to Streit, Pullen also relies on a fourth prior art reference which Streit incorporates by

reference for its disclosure of an example map matching system, U.S. Patent No. 5,774,824 to Streit et al. (“Streit ’824”).

In light of the prior art references, BMW asserts that Claims 1 and 3 are invalid on three grounds: (1) under 35 U.S.C. § 102 as being anticipated by Streit; (2) under 35 U.S.C. § 103 as being obvious over Streit in view of Klein; and (3) under 35 U.S.C. § 103 as being obvious over Yoshinori in view of Streit.

IV. LEGAL STANDARDS

“Summary judgment is as available in patent cases as in other areas of litigation.” *Cont’l Can Co. USA v. Monsanto Co.*, 948 F.2d 1264, 1265 (Fed. Cir. 1991).

A. Summary Judgment

Under Federal Rule of Civil Procedure 56, summary judgment is proper when “there is no genuine dispute as to any material fact” and the moving party is “entitled to judgment as a matter of law.” Fed. R. Civ. P. 56(a). “In deciding a motion for summary judgment, the court must view the evidence in the light most favorable to the non-moving party, drawing all reasonable inferences in that party’s favor.” *Sagan v. United States*, 342 F.3d 493, 497 (6th Cir. 2003). “Where the moving party has carried its burden of showing that the pleadings, depositions, answers to interrogatories, admissions and affidavits in the record, construed favorably to the non-moving party, do not raise a genuine issue of material fact for trial, entry of

summary judgment is appropriate.” *Gutierrez v. Lynch*, 826 F.2d 1534, 1536 (6th Cir. 1987) (citing *Celotex Corp. v. Catrett*, 477 U.S. 317, 322 (1986)).

The court does not weigh the evidence to determine the truth of the matter, but rather, to determine if the evidence produced creates a genuine issue for trial. *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 249 (1986). The moving party discharges its burden by “‘showing’—that is, pointing out to the district court—that there is an absence of evidence to support the nonmoving party’s case.” *Horton v. Potter*, 369 F.3d 906, 909 (6th Cir. 2004) (quoting *Celotex*, 477 U.S. at 325).

The burden then shifts to the non-moving party, who “must do more than simply show that there is some metaphysical doubt as to the material facts.” *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 586 (1986). The non-moving party must put forth enough evidence to show that there exists “a genuine issue for trial.” *Horton*, 369 F.3d at 909 (citing *Matsushita*, 475 U.S. at 587). Summary judgment is not appropriate when “the evidence presents a sufficient disagreement to require submission to a jury.” *Anderson*, 477 U.S. at 251-52.

The existence of a factual dispute alone does not, however, defeat a properly supported motion for summary judgment—the disputed factual issue must be material. “The judge’s inquiry, therefore, unavoidably asks whether reasonable jurors could find by a preponderance of the evidence that the plaintiff is entitled to a verdict—whether there is evidence upon which a jury can properly proceed to find

a verdict for the party producing it, upon whom the onus of proof is imposed.” *Id.* at 252 (quotation and alteration omitted). A fact is “material” for purposes of summary judgment when proof of that fact would establish or refute an essential element of the claim or a defense advanced by either party. *Kendall v. Hoover Co.*, 751 F.2d 171, 174 (6th Cir. 1984) (citation omitted).

B. Prior Art Invalidity Defenses

The Patent Act establishes invalidity as a defense to infringement. 35 U.S.C. § 282(b). Under an invalidity defense, an accused infringer can “attempt to prove that the patent never should have issued in the first place.” *Microsoft Corp. v. i4i Ltd. P’ship*, 564 U.S. 91, 96 (2011). A patent enjoys a statutory presumption of validity, and the party asserting invalidity must prove invalidity by clear and convincing evidence. 35 U.S.C. § 282(a); *Microsoft*, 564 U.S. at 95.

Invalidity of an entire patent, or any of its individual claims, is proven when it is shown that any “condition for patentability” specified in part II of the Patent Act was lacking at the time the patent issued. 35 U.S.C. § 282(b)(2). As a condition for patentability, part II of the Patent Act requires that the claimed invention be novel under Section 102 and nonobvious under Section 103. *Id.* §§ 102 and 103.

Under Section 102, a patent is invalid as anticipated (i.e., lacking novelty) when the invention is identically disclosed or described in a patent, a published patent application, or a printed publication. *Id.* § 102. “To anticipate a claim, a single

prior art reference must expressly or inherently disclose each claim limitation.” *Crown Packaging Tech. v. Ball Metal Beverage*, 635 F.3d 1373, 1383 (Fed. Cir. 2011). “Although anticipation is a question of fact, it still may be decided on summary judgment if the record reveals no genuine dispute of material fact.” *Telemac Cellular Corp. v. Topp Telecom, Inc.*, 247 F.3d 1316, 1327 (Fed. Cir. 2001)

Under Section 103, a patent that is not identically disclosed or described under Section 102 is invalid as obvious “if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” 35 U.S.C. § 103(a). Obviousness is a question of law based on underlying factual findings. *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966). The relevant factual findings include (1) the scope and content of the prior art, (2) the differences between the prior art and the claims, (3) the level of ordinary skill in the art, and (4) any relevant secondary considerations. *Id.* at 17-18. Obviousness may be decided on summary judgment if the relevant factual findings under the *Graham* factors “are not in material dispute, and the obviousness of the claim is apparent in light of these factors.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 427 (2007).

V. VALIDITY ANALYSIS

Beacon moves for summary judgment of no invalidity on four grounds. Beacon's first three grounds are focused on the Streit prior art reference, and Beacon's fourth ground is focused on the Yoshinori prior art reference. First, as to BMW's invalidity defense that Claim 1 is anticipated by Streit, Beacon moves for summary judgment because Streit does not disclose the "GPS velocity information" limitation in Claim 1. Second, as to BMW's invalidity defense that Claims 1 and 3 are anticipated by Streit, Beacon moves for summary judgment because Streit does not disclose the "rotates/integrates" and "rotating/integrating" limitations in Claims 1 and 3. Third, as to BMW's invalidity defense that Claims 1 and 3 are obvious over Streit in view of Klein, Beacon moves for summary judgment because the combination of Streit and Klein does not disclose the "rotates" and "rotating" limitations in Claims 1 and 3. Fourth, as to BMW's invalidity defense that Claims 1 and 3 are obvious over Yoshinori in view of Streit, Beacon moves for summary judgment because BMW should be precluded from asserting that Yoshinori discloses the "rotates" and "rotating" limitations in Claims 1 and 3.

For the reasons set forth below, the Court finds that Beacon is entitled to summary judgment of no invalidity as set forth in Beacon's first, second, and third grounds. However, the Court finds that Beacon is not entitled to summary judgment of no invalidity as set forth in Beacon's fourth ground. On the whole, the Court finds

that Beacon is entitled to summary judgment as to BMW's invalidity defense that Claims 1 and 3 are anticipated by Streit and as to BMW's invalidity defense that Claims 1 and 3 are obvious over Streit in view of Klein. However, the Court finds that Beacon is not entitled to summary judgment as to BMW's invalidity defense that Claims 1 and 3 are obvious over Yoshinori in view of Streit.

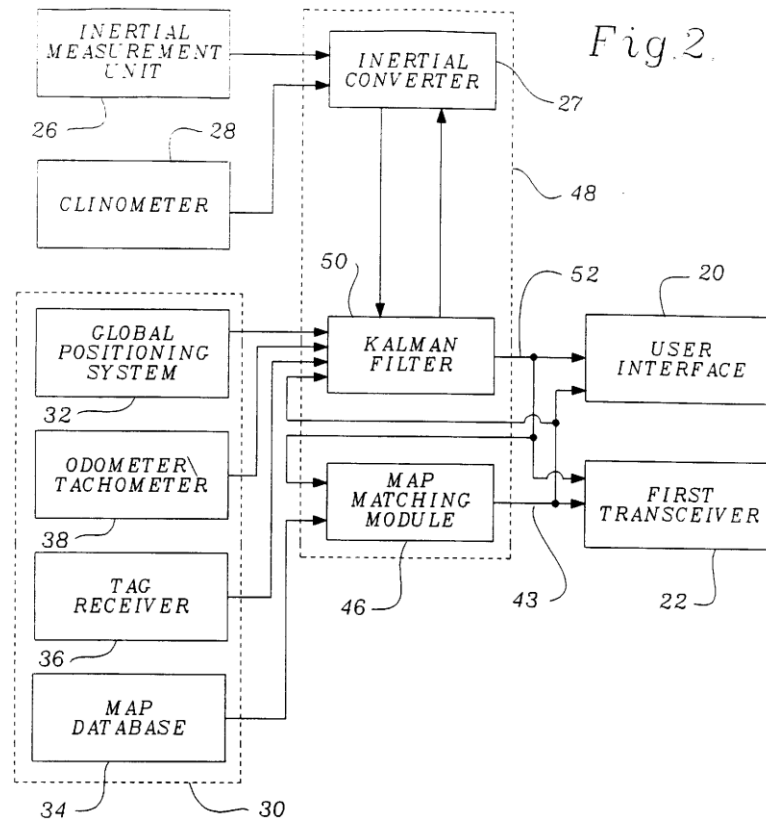
A. Streit

As noted above, Beacon's first three grounds for summary judgment of no invalidity are focused on the Streit prior art reference. Streit is entitled "Apparatus and Method for Tracking a Vehicle." Streit '824, which Streit incorporates by reference for its disclosure of an example map matching system, is entitled "Map-Matching Navigation System." Streit was filed in the USPTO on August 24, 1995 and issued as a patent on May 11, 1999. Streit '824 was filed in the USPTO on August 24, 1995 and issued as a patent on June 30, 1998.

Streit discloses a vehicle tracking system that determines vehicle state information, such as position, velocity, and heading information, through the combination of a Kalman filter and various GPS and non-GPS components. As explained below, as inputs to the Kalman filter, some components provide inertial vehicle state information, while other components provide redundant vehicle state information. The Kalman filter combines the vehicle state information from the components (also known as "sensor fusion") to determine corrected vehicle state

information. Streit 5:36-39. As described by Streit, the Kalman filter is a “recursive estimation filter” for “removing error” that is “preferably configured to assign independent weights to the vehicle state information provided from each source depending upon the level of confidence in the accuracy of the source.” *Id.* 5:7-12, 5:32-35. “In effect,” Streit explains, the Kalman filter “uses each new vehicle state observation to update a probability distribution for the state of the vehicle.” *Id.* 5:20-23.

As shown in Figure 2, reproduced below, the vehicle tracking system includes a user interface (20), an inertial measurement unit (26), redundant sensors (30), and a processor (48). As part of the processor (48), the vehicle tracking system includes the Kalman filter (50), whose output (52) includes the corrected vehicle state information, as well as an inertial converter (27) and a map matching module (46).

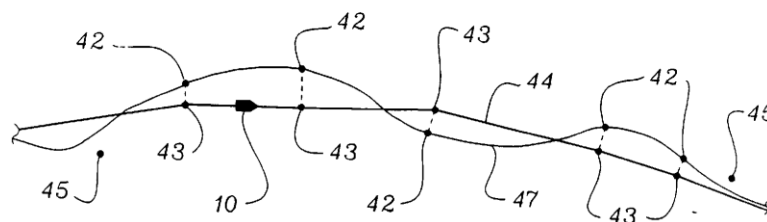


The inertial measurement unit (26) and the inertial converter (27) provide the inertial vehicle state information to the Kalman filter (50). In relevant part, the inertial measurement unit (26) includes an accelerometer and a gyro. *Id.* 3:13-17. In connection with the inertial measurement unit (26), the inertial converter (27) is organized into a velocity module and an attitude module. *Id.* 3:21-22. The velocity module integrates the output of the accelerometer once to obtain velocity information and twice to obtain position information. *Id.* 3:22-27. To obtain heading information, the attitude module integrates the output of the gyro. *Id.* 3:28-30. With respect to the redundant vehicle state information, among other components, the redundant sensors (30) include a Global Positioning System (GPS) (32), an

odometer/tachometer (38), and a map database (34). In conjunction with a GPS receiver (31) shown elsewhere in the figures, the GPS (32) provides position information to the Kalman filter (50). *Id.* 3:56-59. Moreover, the odometer/tachometer (38) provides distance and velocity information. *Id.* 4:63-5:4. The map database (34) and the map matching module (46) together form a map matching system that provides position and heading information. *Id.* 4:1-43.

With respect to the map matching system, as shown in Figure 3, reproduced below, the vehicle tracking system applies vehicle state information to the map matching module (46) in the form of measured points (42). *Id.* 4:19-25. The map matching module (46) then determines matched points (43) by matching the measured points (42) to the most probable position of the vehicle on a map route (44) from the map database (34). *Id.* 4:28-32. The vehicle tracking system then applies the matched points (43) to the user interface (20) to display the location of the vehicle on the map route (44). *Id.* 5:49-53.

Fig.3.



Streit also describes that the map matching module (46) may update the position and heading information of the vehicle with information from the map

database (34) at positions on the map route (44) where the confidence in the position of the vehicle is high. *Id.* 4:32-43. While Streit does not elaborate on this point, as noted above, Streit incorporates Streit '824 by reference for its disclosure of an example map matching system. *Id.* 4:4-10. Streit '824 describes that the map matching module (46) may update the measured points (42) and the matched points (43) with the end of curves in the map route (44), which are defined in the map database (34) with both position and heading information. Streit '824 3:27-30, 4:16-23.

B. Application of Streit to the Asserted Claims

In his invalidity report, Pullen concludes that Streit discloses each and every limitation of the asserted claims. As explained below, as to the rotate–then–integrate sequence, Pullen identifies the map matching module as the component that performs rotation, and the vehicle tracking system generally as the component that performs integration. With reference to Figure 2, reproduced above, Pullen describes that the “iteration” relevant to his invalidity conclusions begins when the vehicle tracking system applies the output of the Kalman filter to the map matching module. ECF No. 102-3, PageID.5474 (Pullen Report ¶ 83). As noted above, Streit describes that the map matching module may update the heading information of the vehicle. As described by Pullen, this means that the map matching module “map-matches” the output of the Kalman filter, and thereby “replaces” the heading information with

a map heading from the map database. *Id.*, PageID.5482-5483 (Pullen Report ¶ 102). As such, the map matching module outputs “map-matched” and therefore “rotated” position, velocity, and heading information. *Id.*, PageID.5483-5484 (Pullen Report ¶¶ 103-104). Pullen describes that the output of the map matching module is then applied to the Kalman filter, which then outputs “corrected map-matched” position, velocity, and heading information. *Id.*, PageID.5484 (Pullen Report ¶ 104). Lastly, to display the location of the vehicle on the user interface, Pullen describes that the vehicle tracking system would have to integrate the corrected map-matched velocity information to calculate displacements. *Id.*, PageID.5484 (Pullen Report ¶¶ 104-105).

C. GPS Velocity Information (Claim 1 in Light of Streit)

Beacon’s first ground for summary judgment of no invalidity is directed to the “GPS velocity information” limitation in Claim 1 and concerns the doctrine of inherency. In his invalidity report, Pullen does not identify an explicit disclosure of GPS velocity information. Rather, Pullen cites separate passages from Streit to reason that the GPS receiver is a redundant sensor, the redundant sensors provide vehicle state information, the vehicle state information includes velocity information, and, therefore, the GPS receiver provides GPS velocity information. *Id.*, PageID.5475-5476 (Pullen Report ¶ 86). In his deposition, Pullen eventually conceded that Streit does not explicitly disclose GPS velocity information. ECF No.

102-17, PageID.5979 (Pullen Dep. Tr. 62:2-5) (“at least right now, I don’t recall a specific place where it mentions GPS velocity in—in so many words, the word ‘velocity’”).

“To serve as an anticipation when the reference is silent about the asserted inherent characteristic, such gap in the reference may be filled with recourse to extrinsic evidence.” *Cont’l Can.*, 948 F.2d at 1268. “Such evidence must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.” *Id.* “Demonstrating inherent disclosure requires meeting a stringent standard.” *Amgen Inc. v. Sandoz, Inc.*, 66 F.4th 952, 966 (Fed. Cir. 2023). “Inherency ... may not be established by probabilities or possibilities.” *In re Oelrich*, 666 F.2d 578, 581 (C.C.P.A. 1981). “The mere fact that a certain thing *may* result from a given set of circumstances is not sufficient.” *Id.*

In its motion, Beacon moves for summary judgment as to Claim 1 because Pullen acknowledged in his deposition that GPS velocity information is not necessary. Because Streit therefore does not explicitly or inherently disclose the “GPS velocity information” limitation, Beacon argues that summary judgment is appropriate. In opposition, BMW argues that summary judgment is not appropriate because GPS receivers are capable of providing GPS velocity information and a

person of ordinary skill in the art would know the advantages of using GPS velocity information.

As to Beacon's first ground, the Court finds that Beacon is entitled to summary judgment of no invalidity. Initially, the Court notes that Streit is not entirely silent about whether the vehicle tracking system uses GPS velocity information. In connection with the Kalman filter, Streit is focused on the components for providing inertial and redundant position, velocity, and heading information as inputs. Likewise, Streit particularly describes the redundant vehicle state information provided by each redundant sensor. As to the GPS, Streit repeatedly describes that the GPS receiver provides position information. Streit 3:56-59 (the vehicle includes a GPS receiver "for receiving position data"), 3:60-63 (explaining advantages of the GPS in terms of "the position data"), 6:56-58 (independent claim 5 reciting a GPS "to provide position information"), 8:27-28 (independent claim 17 reciting a GPS "to provide position information"). On the other hand, Streit describes that non-GPS redundant sensors such as the tachometer provide velocity information. *Id.* 5:2-4. Streit not only lacks explicit disclosure of GPS velocity information, but also describes sufficient velocity information from non-GPS redundant sensors to render the use of GPS velocity information unnecessary.

In fact, while maintaining that it would only make sense, Pullen acknowledged in his deposition that it is not necessary for the vehicle tracking system to use GPS velocity information. ECF No. 102-17, PageID.5978 (Pullen Dep. Tr. 61:12-18) (“Q. Okay. But the GPS system, as described in column 3, could just input only position data to the Kalman filter described in Streit? A. Yes, it could. That would be one of many—one of the many embodiments of Streit. A POSITA would understand that it makes sense also to input velocity if you’re tracking velocity.”); *id.*, PageID.5979 (Pullen Dep. Tr. 62:12-15) (“Q. Okay. So, you could put in GPS position to the Kalman filter, or GPS velocity to the Kalman filter, or both? A. That’s right.”). Likewise, BMW identifies advantages of GPS velocity information, but not any reason why the vehicle tracking system requires GPS velocity information as an input to the Kalman filter.

Having considered the written briefs and the evidence of record, the Court concludes that BMW cannot meet its burden of proving by clear and convincing evidence that Streit explicitly or inherently discloses the “GPS velocity information” limitation in Claim 1. The Federal Circuit makes clear that “anticipation by inherent disclosure is appropriate only when the reference discloses prior art that must *necessarily* include the unstated limitation.” *Transclean Corp. v. Bridgewood Servs., Inc.*, 290 F.3d 1364, 1373 (Fed. Cir. 2002). Here, Streit does not explicitly disclose GPS velocity information, and there is ultimately no genuine dispute that it is not

necessary for the vehicle tracking system to use GPS velocity information as an input to the Kalman filter. Accordingly, the Court finds that Beacon is entitled to summary judgment as to BMW's invalidity defense that Claim 1 is anticipated by Streit.

D. "Rotates/Integrates" (Claims 1 and 3 in Light of Streit)

Beacon's second ground for summary judgment of no invalidity is directed to the "rotates/integrates" and "rotating/integrating" limitations in Claims 1 and 3. As recited in Claim 1, which is representative for purposes of the below discussion, the claim language recites that the navigation system "rotates said velocity to align with said map heading," "integrates the rotated velocity to obtain displacements," and, ultimately, "obtains said current position by applying said displacements to said previous position."

In its motion, Beacon's basic contention is that summary judgment is appropriate because Pullen's conclusion that Streit discloses the "rotates/integrates" and "rotating/integrating" limitations does not follow from a reasonable reading of the prior art reference. For example, Beacon points out that Streit discloses updating heading information in the context of position information, namely, measured points and matched points, not velocity information. Moreover, Beacon points out that Streit discloses integration in the context of the inertial converter as an input to the Kalman filter, not the output of the Kalman filter and the user interface. Similarly, Beacon questions why, to display the location of the vehicle on the user interface,

the vehicle tracking system would integrate the corrected velocity information, as opposed to using the already-determined corrected position information.

As to Beacon's second ground, the Court finds that Beacon is entitled to summary judgment of no invalidity. At the outset, the Court observes that many of BMW's arguments rely on Beacon's infringement theory, not BMW's invalidity theory. Similar to Streit, the accused navigation systems include a Kalman filter as part of their computer source code. Maintaining that the two Kalman filters are "exactly" alike, BMW cites testimony from Beacon's technical expert on infringement to argue by analogy that, if the accused navigation systems infringe, then Streit anticipates. ECF No. 116 *SEALED*, PageID.7313-7314 (BMW's Opp'n Br. 21-22). The Court will disregard BMW's arguments for two reasons.

First, it is not apparent that BMW's arguments are directed to relevant evidence. Both the '511 Patent and the Streit prior art reference were filed in the USPTO in 1995. On the other hand, Beacon's infringement theory was disclosed in 2023, and is directed to the accused navigation systems which BMW began offering in 2008. BMW does not identify any support for the proposition that every Kalman filter in every navigation system is and always has been designed "exactly" the same way, so as to suggest that either the accused navigation systems or Beacon's infringement theory represent possible prior art to the '511 Patent that would be relevant to the validity analysis in this case.

Second, with respect to the application of Streit to the asserted claims, BMW's arguments directly contradict the expert testimony BMW offers as allegedly clear and convincing evidence of invalidity. For example, in one argument, BMW maintains that the Kalman filter performs integration after the map matching module performs rotation. *Id.*, PageID.7313 (BMW's Opp'n Br. 21) (arguing by analogy that Streit practices "integrating in the Kalman filter after rotation via map-matching"). In his invalidity report, however, Pullen repeatedly identifies the Kalman filter as not being the component that performs integration. ECF No. 102-3, PageID.5481-5484 (Pullen Report ¶¶ 98, 101, 103). "Again," Pullen emphasizes, "this is not the 'integration' as required by the claims; the Kalman filter is used by Streit to 'reduce error within the vehicle tracking system and improve the accuracy thereof,' not to calculate the displacements." *Id.*, PageID.5483-5484 (Pullen Report ¶ 103).

In another argument, BMW maintains that the Kalman filter performs both rotation and integration. ECF No. 116 *SEALED*, PageID.7314 (BMW's Opp'n Br. 22) (arguing by analogy that the Kalman filter in Streit practices "the 'rotation' and 'integration' limitations"). In his invalidity report, however, Pullen identifies the map matching module as the component that performs rotation. ECF No. 102-3, PageID.5477-5480, 5482-5483 (Pullen Report ¶¶ 92-96, 102). As described by Pullen, "the map matching module replaces the vehicle's heading with the heading from the map database" and therefore "velocity is 'rotated' to align with the map

heading by the map matching module.” *Id.*, PageID.5482-5483 (Pullen Report ¶ 102). Furthermore, Pullen identifies that integration is multiple steps removed from rotation. Specifically, Pullen describes that the map matching module performs rotation to output the map-matched velocity information, and then the Kalman filter outputs the corrected map-matched velocity information, and then, to display the location of the vehicle on the user interface, the vehicle tracking system integrates the corrected map-matched velocity information to calculate the displacements. *Id.*, PageID.5482-5484 (Pullen Report ¶¶ 102-105).

Beacon has presented specific challenges to BMW’s invalidity theory as disclosed through Pullen’s invalidity report. As to Pullen’s application of Streit to the asserted claims, BMW cannot avoid Beacon’s specific challenges by arguing that the generally described Kalman filter performs whatever rotation and/or integration that the identified components cannot reasonably be said to perform. *Cf. Schumer v. Lab’y Comput. Sys., Inc.*, 308 F.3d 1304, 1315 (Fed. Cir. 2002) (“Evidence of invalidity must be clear as well as convincing.”).

Setting aside BMW’s arguments relying on Beacon’s infringement theory, BMW generally stands on Pullen’s invalidity report. As to both rotation and integration, Pullen’s conclusion that Streit discloses each and every limitation of the asserted claims ultimately rests on the concept of map-matched velocity information. Similar to the above issue about using GPS velocity information, Streit is not entirely

silent about whether the vehicle tracking system integrates rotated velocity information. As set forth above, as to rotation, Pullen describes that the vehicle tracking system applies the output of the Kalman filter to the map matching module, which may update the heading information of the vehicle. Apparently taking this to mean that every output gets applied and that every heading gets replaced, Pullen describes that the map matching module outputs map-matched velocity information. However, Streit particularly describes that the vehicle tracking system applies measured points to the map matching module, and that the map matching module then determines matched points. Streit 4:19-25, 4:28-32. To the extent it updates the heading information of the vehicle, Streit '824 particularly describes that the map matching module updates the matched points with the end of curves in the map route. Streit '824 4:16-23. Notably, Streit '824, which is focused entirely on the map matching system, never once uses the word "velocity." Moreover, the purpose of the Kalman filter is to remove errors from all of the redundant sensors, including the map matching system. Streit 5:7-12. As distinguished from updating heading information inside the map matching system, for combination with all other inputs to the Kalman filter, Streit does not reasonably disclose the replacement of every heading throughout the vehicle tracking system.

Having considered the written briefs and the evidence of record, the Court concludes that BMW cannot meet its burden of proving by clear and convincing

evidence that Streit explicitly or inherently discloses the “rotates/integrates” and “rotating/integrating” limitations in Claims 1 and 3. At bottom, this case does not present an issue of “missing descriptive matter” inviting recourse to expert testimony to fill in a “gap in the reference.” *Cont’l Can.*, 948 F.2d at 1268. Rather than filling in gaps, Pullen cites passages where Streit particularly describes doing one thing, to reason that Streit discloses doing another thing. No person informed only by Streit, and not the ’511 Patent, could apply a reasoned analysis and conclude that Streit explicitly or inherently discloses the concept of map-matched velocity information. *Cf. W.L. Gore & Assocs., Inc., v. Garlock, Inc.*, 721 F.2d 1540, 1553 (Fed. Cir. 1983) (“It is difficult but necessary that the decisionmaker forget what he or she has been taught ... about the claimed invention and cast the mind back to the time the invention was made (often as here many years), to occupy the mind of one skilled in the art who is presented only with the references ...”). Accordingly, the Court finds that Beacon is entitled to summary judgment as to BMW’s invalidity defense that Claims 1 and 3 are anticipated by Streit.

E. “Integrates” (Claims 1 and 3 in Light of Streit and Klein)

Beacon’s third ground for summary judgment of no invalidity turns on whether Streit discloses the “rotates” and “rotating” limitations. Specifically, in addition to being anticipated by Streit, BMW asserts in the alternative that Claims 1 and 3 are obvious over Streit in view of Klein. The parties agree that Klein is directed

to the “integrates” and “integrating” limitations. In its motion, Beacon argues that summary judgment is appropriate because Streit, and therefore the combination of Streit and Klein, does not disclose the “rotates” and “rotating” limitations. In opposition, BMW does not dispute that, to the extent Streit does not disclose the “rotates” and “rotating” limitations, Klein does not cure the deficiency.

In accordance with the positions of the parties, for the same reasons stated above, the Court concludes that BMW cannot meet its burden of proving by clear and convincing evidence that the combination of Streit and Klein explicitly or inherently discloses the “rotates” and “rotating” limitations in Claims 1 and 3. Accordingly, the Court finds that Beacon is entitled to summary judgment as to BMW’s invalidity defense that Claims 1 and 3 are obvious over Streit in view of Klein.

F. “Rotates” (Claims 1 and 3 in Light of Yoshinori and Streit)

Beacon’s fourth ground for summary judgment of no invalidity is directed to Pullen’s allegedly contradictory prior testimony to the USPTO in a reexamination proceeding. For background, the USPTO has considered Yoshinori three times, most recently in the last reexamination, which the USPTO ordered on BMW’s request. As to Claim 1, which is representative for purposes of the below discussion, the USPTO has found that Yoshinori discloses the “integrates” limitation, but not the “rotates” limitation. As found by the Examiner in an earlier reexamination,

Yoshinori instead describes integrating a GPS velocity to obtain a current position, and then applying map matching to the current position. ECF No. 102-14, PageID.5884-5887. In short, the USPTO has found that Yoshinori discloses concurrent integration and map matching, not rotation followed by integration.

In the last reexamination, BMW, as here, engaged Pullen as its technical expert. In his declaration in support of BMW's request, Pullen concluded that the asserted claims were obvious over Yoshinori in view of secondary prior art references. Among other things, Pullen described that Yoshinori discloses "key parts" of the claim language, including "integrat[ing] the [] velocity to obtain displacements," with the bracketed-out word being "rotated." ECF No. 102-15, PageID.5923. "Although Yoshinori does not explicitly state that the system 'rotates' the velocity to align with a map heading," Pullen turned to the secondary prior art references to explain that "rotating a vector to align with another vector was a well-known technique taught in the prior art" *Id.*, PageID.5924. Likewise, in its request, BMW cited Pullen's declaration to argue that Yoshinori discloses each and every limitation of the asserted claims "other than" the "rotates" and "integrates" limitations. ECF No. 102-7, PageID.5612.

In its motion, Beacon points out that, in his present invalidity report, Pullen concludes that Yoshinori discloses each and every limitation of the asserted claims. Notably, Beacon does not address the content of Yoshinori or rebut Pullen's

application of Yoshinori to the asserted claims. Rather, Beacon cites the “sham affidavit rule” to argue that BMW should be precluded from contradicting Pullen’s prior testimony and asserting that Yoshinori discloses the “rotates” and “rotating” limitations in Claims 1 and 3. In opposition, BMW argues that preclusion is not warranted because Pullen does not contradict his prior testimony and explained why in his deposition.

As explained below, having considered the written briefs and the evidence of record, the Court agrees with BMW. In describing the sham affidavit rule, the Supreme Court has observed that lower courts have found a “need for explanation” and “held with virtual unanimity that a party cannot create a genuine issue of fact sufficient to survive summary judgment simply by contradicting his or her own previous sworn statement ... without explaining the contradiction or attempting to resolve the disparity.” *Cleveland v. Pol’y Mgmt. Sys. Corp.*, 526 U.S. 795, 806 (1999). As stated by the Sixth Circuit, “a party may not create a factual issue by filing an affidavit, after a motion for summary judgment has been made, which contradicts her earlier deposition testimony.” *Johnson v. Ford Motor Co.*, 13 F.4th 493, 501 (6th Cir. 2021) (quotation and alteration omitted). “In determining the affidavit’s admissibility at summary judgment, the district court must first consider whether the affidavit directly contradicts the non-moving party’s prior sworn testimony, which, if so, absent a persuasive justification for the contradiction, the

court should not consider the affidavit.” *Id.* (quotation and alteration omitted). “If the affidavit does not directly contradict prior sworn testimony, it should be stricken if it is an attempt to create a sham fact issue.” *Id.* (quotation and alteration omitted).

Here, without passing on the merits of Pullen’s application of Yoshinori to the asserted claims, the Court finds that Pullen and BMW have sufficiently explained the disparity between Pullen’s prior and present testimony. In the last reexamination, the secondary prior art references were directed to the math for vector rotation. BMW explains that Pullen’s prior testimony came at a time when BMW understood that the “rotates” limitation imposed some sort of vector calculus requirement. But at the appeal stage, Beacon suggested that “replaces” qualifies as “rotates.” ECF No. 73-2, PageID.3905. In his deposition, Pullen emphasized his wording that Yoshinori does not “explicitly” use the word “rotates.” With the new understanding of the “rotates” limitation, Pullen explained that Yoshinori “discloses the steps in different words” and that his present testimony is “the same” with the exception of needing to rely on the secondary prior art references. ECF No. 116-2 *SEALED*, PageID.7337-7338 (Pullen Dep. Tr. 131:20-132:22). Indeed, in his declaration to the USPTO, Pullen elsewhere described that “Yoshinori teaches that the comparison [between the measured heading and the map heading] is performed to ... make the [measured heading] coincide with the road, and that this occurs prior to continuing

execution of the navigation algorithm to propagate the current position.” ECF No. 102-15, PageID.5924.

In summary, the difference between Pullen’s prior and present testimony is simply that Yoshinori no longer needs to be combined with the secondary prior art references. Because Pullen and BMW have sufficiently explained the disparity, the Court finds that BMW should not be precluded from asserting that Yoshinori discloses the “rotates” and “rotating” limitations in Claims 1 and 3. Accordingly, the Court finds that Beacon is not entitled to summary judgment as to BMW’s invalidity defense that Claims 1 and 3 are obvious over Yoshinori in view of Streit.

VI. CONCLUSION

For the reasons stated in this opinion and order, the Court will **GRANT IN PART** and **DENY IN PART** Beacon’s motion for summary judgment of no invalidity.

SO ORDERED.

Dated: September 18, 2024
Detroit, Michigan

s/Mark A. Goldsmith
MARK A. GOLDSMITH
United States District Judge